



# ***Power Electronics and Drives***

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## **3-0-0-6      EE385**

Power Semiconductor Devices: Diode, BJT, MOSFET, SCR, Triac, GTO, IGBT, MCT and their V-I characteristics, ratings, driver circuits, protection and cooling; AC-DC Converters (Rectifiers): Diode rectifier, thyristor based rectifier, effect of source inductance, single/three phase rectifiers, semi/full rectifiers, power factor, harmonics; DC-AC Converters (Inverters): Concept of switched mode inverters, PWM switching, voltage and frequency control of single/ three phase inverters, harmonics reduction, other switching schemes - square wave pulse switching, programmed harmonic elimination switching, current regulated modulation switching - tolerance band control, fixed frequency control; voltage source inverter (VSI), current source inverter (CSI); DC-DC Converters (Chopper): Principle; buck, boost and buck-boost converters; AC Voltage Controllers: Principle of ON-OFF control and phase control, single/three phase controllers, PWM AC voltage controller, cycloconverters; Electric drives: introduction and classification. DC motor drives: speed-torque characteristics of shunt, series, PMDC motors; dynamic models; speed and position control methods; AC motor drives: d-q model of induction motor; constant flux speed control structure; vector control model; vector control structure.

### ***Texts:***

1. N. Mohan, Power Electronics- Converters, Applications and Design, 3rd Ed., John Wiley & Sons, 2003.
2. G. K. Dubey, Fundamentals of Electrical Drives, Narosa Publishing House, 2003.



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## ***References:***

1. M. Rashid, Power Electronics- Circuits, Devices and Applications, 3rd Ed., Prentice Hall, 2004.
2. B. K. Bose, Modern Power Electronics and AC Drives, Pearson Education, 2003.
3. A. M. Trzynadlowski, Introduction to Modern Power Electronics, John Wiley & Sons, 1998.
4. M. Rashid, Power Electronics Handbook, Academic Press-Elsevier, 2001.